

Thermoplastic Insole

BACKGROUND OF THE INVENTION

5 The invention of Thermoplastic Insole which is with the plasticity's property, the insole will thus become soft after heating, user can then step and press on it so as to form the shape of his (her) own foot after cooling. Consequently, it will bring highly comfortable feeling to user due to the individual insole.

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For the time being, the shoes makers normally produce the shoes by means of shoe molding, it will never provide with the individually proprietary shoes so as to fit different user's foot shape. Please note the user
15 wearing new shoes often feels too tight or skin injured, it is because the feet load the whole body's weight during walking, in addition, the feet must bear the pressure as well as friction in a long time which will lead thicker cuticle and cause clavus as well as callus.
20 In serious case, both of hallux valgus and the irritated will occur. Once the foot's reaction happened, it could probably affect not only foot but also knee joint as well as hip joint, even, back pain could therefore induce.

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In order to solve the above problem, we just need to trim the insole whose comfort will be accordingly improved. At present, the methods being applied to adjustable insole include installation of pad of inner
30 wedge or outer wedge, toe pad, heel pad, and arch pad. Yet the above foot auxiliary needs to match with the

shoes' style and user's shape for further purchase,
it just causes the inconvenience.

In view of the inconvenience, I myself make my every
5 endeavor as to research according to several years of
related experiences, the invention is finally available.
Thus, the invention is to provide one kind of Thermo-
plastic Insole, users can preheat the insole, then,
step and press on the insole by foot, the ideally
10 individual foot shape's insole can be produced and
obtained. It provides the better comfort and good
support by means of the insole and, improve the long
term's pressure and abrasion of suffering in the shoes,
so, the related illness can be avoided.
15 Thus, the major purpose of the invention is to provide
one sort of Thermoplastic Insole, and, the plasticity
after heating can be applied to produce the individual
foot shape's insole and provide the better comfort.
20 In addition, another purpose for the invention which
will provide the method of producing and forming subject
to above Thermoplastic Insole.

SUMMARY

25 In order to achieve the above goal, the invention comes
true by the way like this: Thermoplastic Insole is
orderly composed of polyethylene layer, thermoplastic
layer and surface-clothing layer from bottom to the
top. Would stress the feature: the thermoplastic layer
30 after heating which will provide the plasticity, and
it will be applied to produce the perfect foot shape

for the individual user.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig.1 is a separated structure of Thermoplastic Insole.

5 Fig.2 is a cutaway structure of Thermoplastic Insole.

Fig.3 is a flow chart of processing of Thermoplastic Insole.

Fig.4 is a flow chart of plasticity of Thermoplastic Insole.

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List Of Reference Numbers:

1-Plasticized Insole

11-Polyethylene Layer

12-Thermoplastic Layer

15 121-Blending & Heating

122-Injection

123-Cooling & Shaping

13-Surface-clothing Layer

14-Hot Coating

20 15-Cooling

21-Heat Insole

22-Foot Molding of Pressing

23-Cooling & Shaping

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DETAILED DESCRIPTION

I would like to draw your attention as to further realize the particular structure and function of the invention, hence submit the following instance as well as diagram, and will describe in detail as below:

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Please refer to Fig 1, it's a diagram of separated

structure of inventive Thermoplastic Insole, such as Polyethylene layer - 11, thermoplastic layer - 12, and surface-clothing layer -13, and which are orderly composed from bottom to the top.

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Please refer to Fig.2, it is an cutaway structure of the inventive Thermoplastic Insole, kindly note the polyethylene layer -11 is applied to support the foot's loading from all of body's weight and, avoid the shape changed as well; thermoplastic layer - 12 is with the property of plasticity which will become soft after heating; surface-clothing -13 is with the excellent function such as sweat absorption, deodorization, anti-bacteria, and slight anti-slipperiness.

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Please refer to Fig.3, it is the flow chart of processing of the invention, would breakdown the following 3 major stages:

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<Stage-1> Processing of thermoplastic layer -12:

It will be blended by vinyl acetate, thermoplastic rubber, plasticizer, processing agent, after heating, the liquid form -121 occurs, it is further being injected into form -122, after cooling, the shape is being fixed -123; the best blending ratio to be as below: ethyl acetate: 50%, thermoplastic rubber: 30%, plasticizer: 10%, processing agent: 10%.

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<Stage-2> Hot Coating -14: To put the thermoplastic layer -12 on the polyethylene layer -11 which has been heated and pressed, then, lay surface-clothing

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layer -13 on the thermoplastic layer -12, and heat it at 100 ~ 120 °C for 1 minute, it will make polyethylene layer, thermoplastic layer and surface-clothing layer heatedly coated and form a true one.

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<Stage-3> Cooling -15: Afterwards, the coated one will be cooled at 0 ~ 4°C for 2 minutes, and the thermoplastic insole -1 will be obtained.

With regard to the above thermoplastic layer, the vinyl acetate is with the super plasticity, the recipe's ratio can be the range of 50 ~ 60%; thermoplastic rubber is a highly hydrated material, it's not only with good weatherproof and aging but also super plasticity, the ratio of recipe would be 20 ~ 30%; plasticizer is with the quality of resisting color change, and higher the plasticity; processing agent can accelerate and enable the dissolution.

Please refer to Fig.4, which is a flow chart of plasticity of Thermoplastic Insole of the invention, will heat insole - 21 and become soft status, meanwhile, the user step and press on the insole by foot, then foot molding forms - 22, after shape cooled - 23, the individual insole complied with user's foot is being produced. As for the heating method, would recommend to cover the insole by plastic film or plastic bag, then, dip it into 60~80 °C hot water, alternatively, the dry-heat of processing by oven or microwave is available, yet, the caution to be under 90°C during heating.

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The invention - Thermoplastic Insole has been authorized to Taiwan Footwear Research Institute_as to process the hardness test (see as the enclosed -1): the hardness showed is 50 ~ 55 at 10 ~ 40°C, hence the
5 insole is rather hard; the hardness will drop to 35 while the temperature raises up to 60°C, the sole appears slightly soft and leaves the precious mark; the hardness will drop to 31 while the temperature raises up to 70 °C, the sole has become soft and leaves the obviously
10 precious mark.

With the above description, the invention - Thermoplastic Insole is orderly composed of polyethylene layer, thermoplastic layer and
15 surface-clothing layer from the bottom to the top, simultaneously, the thermoplastic layer is produced and, proportionately blended by vinyl acetate, thermoplastic rubber, plasticizer, and processing agent, after preheating, the insole will turn to soft,
20 user can step and press on the insole so as to produce suitable sole to fit individual foot, it thus provide the better comfort and, improve the long term's suffering on foot due to pressure and abrasion, the related illness can be avoided further. It is did with
25 the feature of innovation as well as progression, and comply with the requirement of pattern of invention, hence, would like to apply the inventive pattern accordingly.